

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.

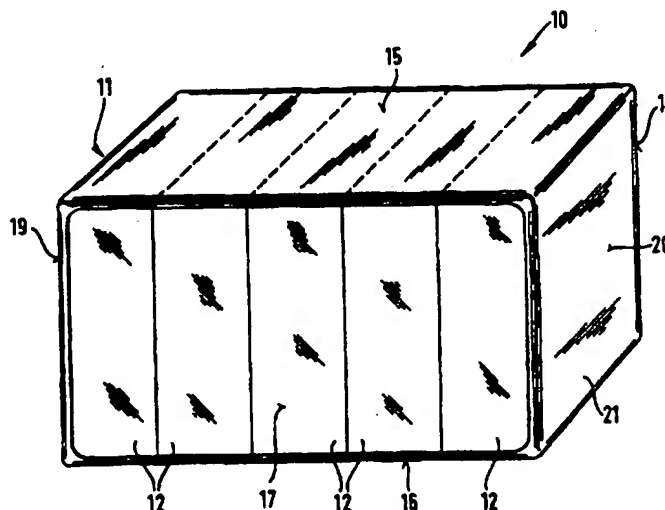
THIS PAGE BLANK (USPTO)



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B65D 75/00	A1	(11) International Publication Number: WO 97/41045 (43) International Publication Date: 6 November 1997 (06.11.97)
(21) International Application Number: PCT/US97/07093 (22) International Filing Date: 28 April 1997 (28.04.97) (30) Priority Data: 96106865.7 1 May 1996 (01.05.96) EP (34) Countries for which the regional or international application was filed: BE et al. (71) Applicant (for all designated States except US): THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US). (72) Inventor; and (75) Inventor/Applicant (for US only): BITOWFT, Bruce, Kevin [US/DE]; Im Hirschgraben 19, D-61479 Glashütten (DE). (74) Agents: REED, T., David et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report.	

(54) Title: STRETCH WRAPPED UNITS FOR FLEXIBLE ARTICLES



(57) Abstract

A unit (10) comprising an array (11) of at least two substantially parallelepipedal flexible packs (12), said packs (12) comprising compressed flexible articles (14) encased in a flexible bag (13), said compressed articles (14) having been compressed to between 20 percent and 70 percent of their uncompressed volume in a direction of compression C, said array (11) comprising a top face (15), a bottom face (16), a front face (17), a back face (18) and two side faces (19, 20) characterised in that said unit (10) comprises a cold stretchable plastic film (21) disposed adjacent to at least a part of at least four consecutive faces (15, 16, 17, 18, 19, 20) of said array (11) and said cold stretchable plastic film (21) non-adhesively attaches to said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon		Republic of Korea	PT	Portugal		
CN	China	KR	Republic of Korea	RO	Romania		
CU	Cuba	KZ	Kazakhstan	RU	Russian Federation		
CZ	Czech Republic	LC	Saint Lucia	SD	Sudan		
DE	Germany	LI	Liechtenstein	SE	Sweden		
DK	Denmark	LK	Sri Lanka	SG	Singapore		
EE	Estonia	LR	Liberia				

STRETCH WRAPPED UNITS FOR FLEXIBLE ARTICLES

Field of the invention

The invention relates to an array of packs, comprising compressed flexible articles encased in flexible bags, which are stretch wrapped with a cold stretchable plastic film and sealed to form a rigid stretch wrapped unit.

Description of the prior art

It is widely known in the art to pack an array of flexible packs comprising compressed flexible articles encased in flexible bags in cardboard cases of fixed dimensions for ease of handling, storage and transport. The space inside these cases cannot be fully utilised because of the tolerances imposed by the variations in the pack dimensions resulting from the production processes and the usual automatic mechanical packaging systems. Furthermore, due to the deviations in the pack dimensions resulting from the packing of compressible flexible articles into flexible bags, the cardboard cases need to be over-dimensioned. As a consequence of this over-dimensioning, arrays of packs on the bottom of pallets are incapable of supporting the imposed loads when pallets of products are stacked or grouped three pallets high. Therefore, the cardboard cases must be designed to support the extra loads.

An array of packs of compressed flexible articles can also be wrapped in a plastic film. The plastic film can comprise relatively inexpensive materials such as polymeric films or thermoplastic films. Such materials reduce the severity of the disposal problem from an environmental standpoint both with respect to the amount of wrapping material required and the disposability/degradability of the particular wrapping material. In addition, plastic film is lighter and more flexible than cardboard, which is heavy, requires space and has less flexibility for storage since it is rigid and in use continues to occupy the same amount of space even when nearly empty.

Prior art developments include US 5,049,423, which discloses thermoplastic films and more particularly, thermoplastic films having properties making them especially suitable for use as stretch wraps for various foodstuffs, rolls of carpet, liquid containers etc. in various bundling and palletising operations. The load of the pallet may be bundled by stretch wrapping a film several times around the articles to be palletised. The document focuses on the properties of the thermoplastic film.

EP O 294 339 A2 discloses a machine for packaging a plurality of articles, either loose, collected on a tray or inside a container, within a cold stretchable or a semi-stretchable type of film web. The machine includes a stretching device which prevents shrinking of the central region of the film in the longitudinal direction, a wrapping device and a complete sealing unit which seals the film ends while the film is still under tension. The invention takes advantage of the elastic memory of the film web to tightly enclose the packaged articles rather than using the compressibility of the articles to form a rigid stretch wrapped unit.

DE 33 41 897 A1 discloses a process developed by the Hagemann company which results in a stretch wrapped product. The machine wraps articles in pre-stretched film, which contracts at a later stage. The film is drawn from a reeling device under tension and continuously wound in a spiral fashion around the conveyor belt and reels to form a tube, whose end is drawn off. The machine can wrap loosely stacked articles in continuous action and single articles can be handled. The invention does not teach a stretch wrapping process which exploits the compressibility of an array of packs of flexible articles.

Therefore, the prior art does not teach a wrapping system which is independent of the fixed dimensions of the outer cases, which exploits the compressibility of an array of packs of flexible articles and which allows the possibility of sealing the sides of the array of packs to form a completely closed unit.

Object and summary of the invention

The object of the present invention is to produce a rigid and stable unit by stretch wrapping an array of flexible packs of disposable absorbent diapers, sanitary articles, incontinent pads or briefs, bandages and the like, with a cold stretchable plastic film.

The present invention eliminates cardboard as a packaging material by making use of a plastic film, which is stretch wrapped around four consecutive faces of an array of flexible packs. This has subsequently led to several benefits namely, units that are more stable and that are capable of sustaining higher load carrying capacities; a reduction in the overall weight of the units to be handled, stored and transported; a decrease in the level of waste packaging material; and an improved and optimised pallet fit during handling, storage and transport operations.

In accordance with the object of the invention, a unit comprising an array of at least two substantially parallelepipedal packs is provided. The unit has a top face, a bottom face, a front face, a back face and two side faces and comprises a cold stretchable plastic film, which is disposed adjacent to at least four consecutive faces of the array of packs. The cold stretchable plastic film non-adhesively attaches to the faces of the array. Two options exist: either the faces of the array not covered by the cold stretchable plastic film can be left exposed to the environment or the cold stretchable plastic film can be made wide enough to cover the remaining two faces of the array and can be sealed to form a closed unit by a variety of means.

According to the present invention, the object is achieved by a unit having the characteristics specified in the claims.

Brief description of the drawings

The invention will be described hereinafter with reference to the following drawings:

Figure 1 shows a pack comprising compressed flexible articles encased in a flexible bag;

Figure 2 is a perspective view of an array of five packs and a cold stretchable plastic film disposed adjacent to four consecutive faces of the array.

Detailed description of the invention

Figure 1 shows a pack 12 comprising compressed flexible articles 14 encased in a flexible bag 13. The substantially parallelipedal packs 12 are arranged in an up-on-base configuration. Other configurations such as flat-on-face and up-on-side are also possible. The compressed flexible articles 14 may comprise disposable absorbent diapers, sanitary articles, incontinent pads or briefs, bandages and the like. The flexible articles 14 are compressed to between 20 and 70 percent of their uncompressed volume in a direction of compression C. In particular, figure 1 shows a diaper pack 12 comprising between one to fifty disposable absorbent diapers 14 and a plastic bag 13 with a thickness ranging from 20 to 120 micrometres. A method for the compression packing of disposable absorbent diapers into flexible bags has been described in detail in the following patents US 4,934,535, US 4,966,286, US 5,022,216, US 5,050,742 and US 5,150,561.

As is displayed in figure 2, the packs 12 are arranged in the form of an array 11 before transport and storage. An array 11 usually comprises at least two substantially parallelipedal packs 12. More specifically, figure 2 shows a perspective view of a substantially covered array 11 comprising five substantially parallelepipedal packs 12 of the type shown in figure 1. The stretch wrapped array forms the unit 10. For the purposes of transport and storage, a number of units 10 can be stacked or grouped in a plurality of configurations to form a case on a pallet such that a load can be applied to a top panel or to a side panel of the case with the direction of the load being perpendicular to the direction of compression, which is around the circumference of the case. The units are less compressible in directions perpendicular to the direction of compression.

In figure 2, the unit 10 comprises a top face 15, a bottom face 16, a front face 17, a back face 18 and two side faces 19, 20 and a cold

stretchable plastic film 21, which is disposed adjacent to at least four consecutive faces of the array 11 of packs 12. Three stretch wrapping configurations are possible with permutations, namely the cold stretchable film 21 can be disposed adjacent to the top face 15, the back face 18, the bottom face 16 and the front face 17; the side face 19, the top face 15, the remaining side face 20 and the bottom face 16; or the back face 18, the side face 20, the front face 17 and the remaining side face 19. The cold stretchable plastic film 21 non-adhesively attaches to all the faces 15, 16 17, 18, 19, 20 of the array 11. The faces 15, 16 17, 18, 19, 20, depending on the selected stretch wrapping configuration, not covered by the cold stretchable plastic film 21 remain exposed to the environment. In figure 2, in particular, the cold stretchable plastic film 21 is wrapped around the side face 19, the top face 15, the remaining side face 20 and the bottom face 16.

The cold stretchable plastic film 21 can also be disposed adjacent to the top face 15, the back face 18, the bottom face 16, the front face 17 and the side faces 19, 20 of the array 11 to form a completely closed unit 10.

The preferred film 21 is a cold stretchable polyethylene film, which is a plastic film that after being stretched exhibits the property of elastic memory. Such a property enables the film to return substantially to its starting dimensions. The preferred thickness for the cold stretchable film 21 ranges from 15-60 micrometres and it can be stretched in an elongation range from 80-150 percent. The cold stretchable film 21 may either be transparent, white or coloured and in addition, it may comprise graphical indicia, which can also be coloured. By tightly stretch wrapping the cold stretchable film 21 around the array 11 of packs 12, the stability of the array 11 is improved without resulting in a deterioration of the substantially parallelepipedal shape of the array 11. Furthermore, a strong and rigid outer casing for the array 11 is created, which guarantees stability.

What is claimed is:

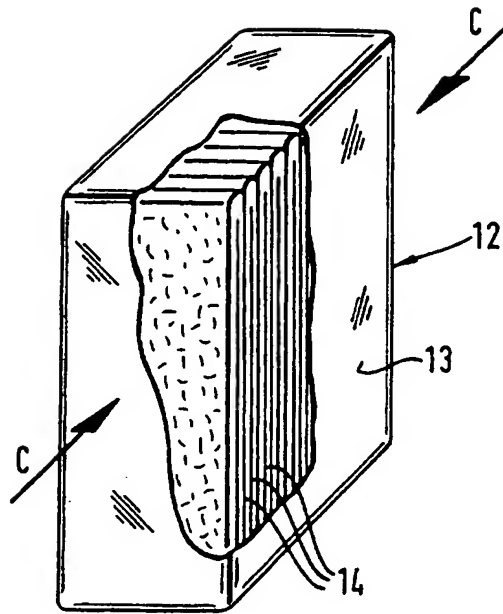
1. A unit (10) comprising an array (11) of at least two substantially parallelepipedal packs (12), said packs (12) comprising compressed flexible articles (14) encased in a flexible bag (13), said compressed articles (14) having been compressed to between 20 percent and 70 percent of their uncompressed volume in a direction of compression C, said array (11) comprising a top face (15), a bottom face (16), a front face (17), a back face (18) and two side faces (19, 20) characterised in that

said unit (10) comprises a cold stretchable plastic film (21) disposed adjacent at least four consecutive faces (15, 16, 17, 18, 19, 20) of said array (11) and said cold stretchable plastic film (21) non-adhesively attaches to said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11).

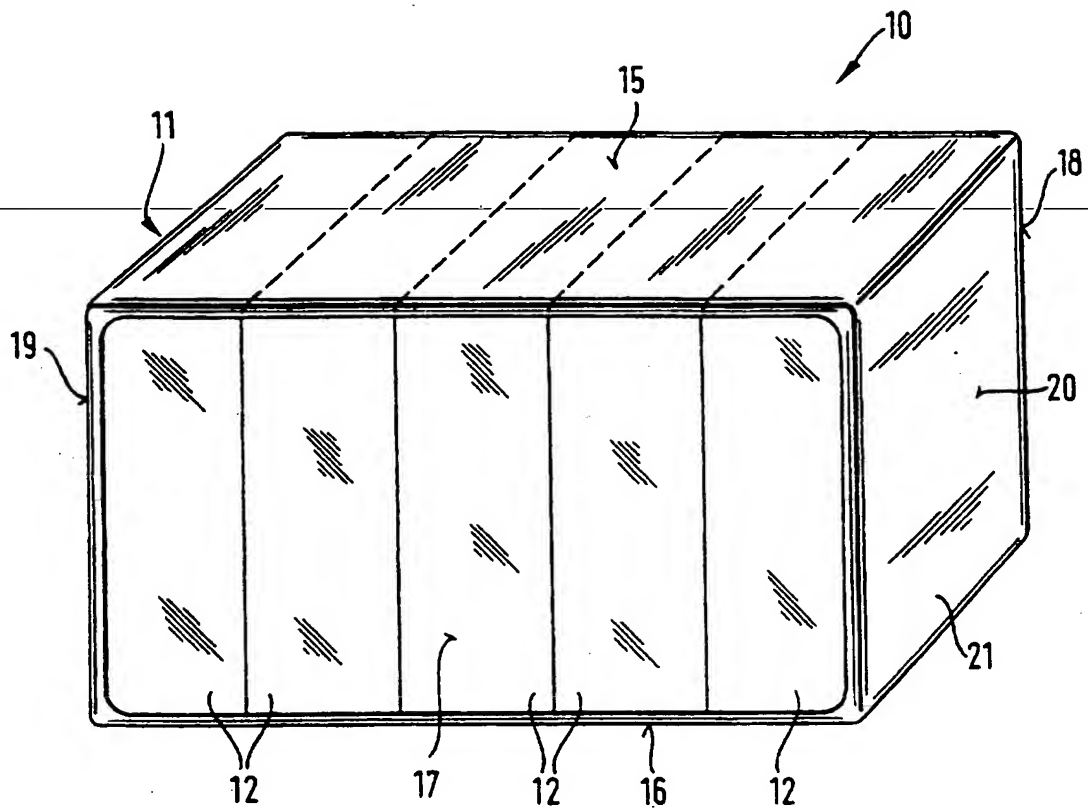
2. A unit (10) according to claim 1 wherein said faces (15, 16, 17, 18, 19, 20) of said array (11) not covered by said cold stretchable plastic film (21) remain exposed to the environment.

3. A unit (10) according to claim 1 wherein said cold stretchable plastic film (21) is disposed adjacent said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11) and sealed to form a closed unit.

1/2

***Fig. 1***

2/2

***Fig. 2***

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 97/07093

A. CLASSIFICATION OF SUBJECT MATTER IPC(6) :B65D 75/00 US CL :206/494 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 206/428, 432, 494, 499, 526 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 3,458,036 (JAMES) 29 JULY 1969.	1
A	US, A, 4,177,895 (SHELTON) 11 DECEMBER 1979.	1
A	US, A, 4,624,991 (HAAS) 25 NOVEMBER 1986.	1
Y	US, A, 4,920,731 (RIMONDI ET AL.) 01 MAY 1990. SEE COL. 2, LINE 2.	1-3
A	US, A, 4,972,659 (CAZES) 27 NOVEMBER 1990.	1
A	US, A, 5,111,931 (GOMBOS ET AL.) 12 MAY 1992.	1
Y	US, A, 5,380,094 (SCHMIDT ET AL.) 10 JANUARY 1995, SEE FIGURES 1-3.	1-3
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 09 JULY 1997		Date of mailing of the international search report 05 AUG 1997
Name and mailing address of the ISA/ Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer STEPHEN MARCUS SPECIAL PROGRAM EXAMINER GROUP 3200 Telephone No. (703) 308-1148

International application No
PCT/US 97/07093

PCT/US 97/07093

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US. A. 5,361,905 (MC QUEENY ET AL.) 08 NOVEMBER 1994, SEE FIGURES 1-14.	1-3
A	US. A. 4,941,755 (CAZES) 17 JULY 1990.	1